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Indian and Indochinese species of *Balitora* (Osteichthyes: Cypriniformes) with descriptions of two new species and comments on the family-group names Balitoridae and Homalopteridae

by

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With 6 figures

ABSTRACT

The family-group name Homalopteridae Bleeker, 1859 is a junior synonym of Balitoridae Swainson, 1839. The genus *Balitora* Gray, 1830 includes eight species; five of them are recorded from the Indian and Indochinese areas: *B. brucei* Gray, 1830 from northern India, *B. mysorensis* Hora, 1940 from Peninsular India, *B. burmanica* Hora, 1932 from the Irrawaddy and Salween basins in Burma and Thailand, *B. meridionalis* new species from south-eastern Thailand and *B. annamitica* new species from the Mekong basin in north-eastern Kampuchea. A common neotype is designated for *B. brucei* and *B. maculata* Gray, 1830, making them simultaneous objective synonyms; *B. brucei* is retained as the valid name for this species. *Balitora brucei melanosoma* Hora, 1932 is a junior subjective synonym of *B. burmanica*.

INTRODUCTION

Balitorine (or homalopterine) loaches live in quickly flowing waters of the Oriental area. Their flattened head and body, horizontally oriented enlarged paired fins with rays bearing adhesive pads covered by unculi (ROBERTS, 1982a) on the ventral surface allow

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them to live in mountain streams and rivulets. Their bionomics have been studied by HORA (1923, 1932) and ALFRED (1969).

HORA (1932) divided the family Homalopteridae into two subfamilies, Homalopterinae and Gastromyzontinae. Later (1950) he considered both taxa as families. Subsequent authors variously treated them as a single family (GREENWOOD *et al.* 1966; GOSLINE 1971; NELSON 1984; CHEN 1978, 1980a, b; WU *et al.*, 1981; ROBERTS 1982a, b; etc.) or two (SILAS 1953; RAMASWANI 1952a, b; etc.). SAWADA (1982) confirmed that homalopterines and gastromyzontines form a monophyletic lineage, the subfamily Homalopterinae of the family Homalopteridae; according to SAWADA, the fishes usually referred to as the subfamily Noemacheilinae (the correct spelling actually is Nemacheilinae: KOTTELAT 1987) of the family Cobitidae (also recently spelled Cobitididae, but see KOTTELAT 1986) in fact are the sister-group of Homalopterinae and should be placed in the family Homalopteridae.

As now understood, the subfamily Homalopterinae includes some 28 genera and 120 species. The genus *Balitora* now includes 8 species, two of them being new and described hereunder. Relationships of *Balitota* and related genera have been investigated by KOTTELAT & CHU (1988).

MATERIAL AND METHODS

The material used belongs to the following collections: British Museum of Natural History (BMNH), author's collection (CMK), Museo Civico de Storia Naturale "Giacomo Doria", Genova (MCSNG), Muséum d'Histoire naturelle, Genève (MHNG), Muséum national d'Histoire naturelle, Paris (MNHN), National Inland Fisheries Institute, Bangkok (NIFI), Naturhistorisches Museum, Basel (NMB), Rijksmuseum van Natuurlijke Historie, Leiden (RMNH), Natur-Museum und Forschungs-Institut Senckenberg, Frankfurt a. M. (SMF).

Counts and measurements follow the method and terminology used for nemacheiline loaches (KOTTELAT 1984), except that head length (HL) is lateral head length and not dorsal head length. Measurements are expressed in % of standard length (SL), unless otherwise stated. Mouth parts nomenclature follows ROBERTS (1982b). Scale ornamentation and size and shape of uncini and tubercles on head show some interspecific variation but are difficult to use in old specimens (particularly those preserved in alcohol).

Toponymy for places in Thailand and Burma follows the official transcription on the 1501 S 1: 250 000 topographic maps of Thailand. Variant spellings are followed by the official one in brackets at first citation. Subsequent citations are automatically emended.

In this paper, the term 'Indochina' is used in its accepted geographical and zoogeographical sense as discussed by KOTTELAT (1985); it is not a reference to former political units.

BALITORIDAE Swainson

During the last 50 years, interrelationships among members of the family Homalopteridae have been variously interpreted but its type-genus, *Homaloptera* van Hasselt, 1823 has always been considered closely related to *Balitora* Gray, 1830 and placed in the same family, subfamily and tribe. Thus the overlooked family-group name Balitorinae Swainson, 1839 (p. 190) being a senior synonym has priority over Homalopteridae.

Considering recent and expected changes in systematics and nomenclature in Cobitoidei (see for example SAWADA 1982 and KOTTELAT 1986, 1987) replacement of Homalopteridae by Balitoridae should not create much additional confusion. Conservation of Homalopteridae would be possible only by use of the plenary powers by the International Commission on Zoological Nomenclature. This would require a long procedure and thus, immediate introduction of the valid name better helps to create a stable nomenclature.

Other family-group names available for balitorine fishes are (in chronological order): Homalopterini Bleeker, 1859, Gastromyzontinae Fowler, 1905, Nemacheilinae Regan, 1911, Adiposidae Jordan, 1923, Crossostominae Silas, 1953, Glaniopsini Silas, 1953, Pseudogastromyzontini Silas, 1953, Vaillantellinae Nalbant & Banarescu, 1977, Beaufortini Chen, 1980, Sinogastromyzontini Chen, 1980 and Parhomalopterini Chen, 1980.

Balitora Gray

Balitora GRAY, 1830: pl. 88 (original indication; type species: *Balitora brucei* Gray, 1830, by subsequent designation by JORDAN 1919: 178). Gender: feminine.

Sinohomaloptera FANG, 1930: 26 (original description as a subgenus of *Homaloptera* van Hasselt, 1823; type species: *Homaloptera kwangsiensis* Fang, 1930, by original designation). Gender: feminine.

Diagnosis: Body strongly depressed; head and abdomen ventrally flattened; mouth inferior, arched, with both jaws covered by a horny sheath; rostral flap divided into three lobes, the median one the largest, between rostral barbels; both lips with one or two rows of papillae; lower lip not interrupted; one (two in *B. longibarbata*) maxillary barbel at the corner of mouth; gill-openings extending on the ventral surface of head; two simple pelvic rays; 8-10 simple and 10-12 branched pectoral rays; adhesive pads present on ventral surface of the 8-11 anterior most pectoral rays and 3-4 anterior most pelvic rays; principal caudal fin rays 10+9, the 4-5 lower ones very closely set, without membranes between them along most of their length.

Discussion: GRAY (1830) illustrated two species of his new genus *Balitora*: *B. brucei* and *B. maculata*. Although there is no description, all three names are available by indication. These taxa appeared on plate 88 of GRAY (1830-1835). This work appeared in 20 issues which have been variously and inconsistently dated in ichthyological literature. SAWYER (1953) traced them and gave dates of publication for all of them. Plate 88 was part of issue No. 3 and was published on 15 July 1830.

KOTTELAT & CHU (1988) investigated the relationships of species now assigned to *Balitora*; they were unable to find a synapomorphy to define it. For all the characters investigated *Balitora* was plesiomorphic. Nevertheless it seems to be a discrete genus which can be distinguished by the above diagnosis. *Balitora pengi* Huang, in ZHENG, CHEN & HUANG 1982, *B. tchangi* Zheng, in ZHENG, CHEN & HUANG 1982 and *B. nujiangensis* Zheng & Zhang, 1983 have been wrongly attributed to *Balitora*. They have 5-6 simple pelvic rays while *Balitora* have only two. They belong to *Hemimyzon* sensu KOTTELAT & CHU (1988).

Differences between the various species in most cases are very slight and might appear of little significance. However, they are very stable. In the only locality where two species occur sympatrically (*B. kwangsiensis* and *B. lancangjiangensis* in Pingbian, Red River basin, Yunnan; material seen in Kunming Institute of Zoology), the differences between

two species which are hardly distinguished become obvious, probably as the result of character displacement.

Chinese species are listed and discussed by KOTTELAT & CHU (1988). The five (two new) Indian and Indochinese species are diagnosed below.

Gender: feminine as shown by the specific epithet *maculata* used in the original description.

KEY TO THE SPECIES OF BALITORA

1. — Two barbels at each corner of mouth *B. longibarbata*
 — A single barbel at each corner of mouth 2
2. — Body 1.3 to 2.0 times wider than deep at pelvic origin 3
 — Body 1.0 to 1.2 times wider than deep at pelvic origin 7
3. — Lateral head length 23-25% SL *B. mysorensis*
 — Lateral head length 19-21% SL 4
4. — Caudal peduncle 3.0-4.2 times longer than deep 5
 — Caudal peduncle 1.9-2.8 times longer than deep 6
5. — Maximum head width 86-105% HL; head width at nares 77-87% HL; interorbital width 41-49% HL; eye diameter 2.3-3.3% SL *B. brucei*
 — Maximum head width 73-86% HL; head width at nares 60-70% HL; interorbital width 37-42% HL; eye diameter 3.0-4.0% SL *B. burmanica*
6. — Unculi in interorbital area, on cheeks and on nape minute and circular; a few larger ones at tip of snout, between nares and between nares and eyes; 9-10 simple and 11 branched pectoral rays; prepelvic length 45-47% SL
 *B. meridionalis*
 — Unculi in interorbital area, on cheeks and on nape elongated, similar in size to keels on scales; no larger ones at tip of snout and between nares; 8 simple and 11-12 branched pectoral rays; prepelvic length 48-49% SL
 *B. annamitica*
7. — Belly naked in front of anus; dorsal fin origin slightly in front of pelvic fin origin *B. kwangsiensis*
 — Belly scaled at least between posterior extremity of pelvic fins and anus; dorsal fin origin above pelvic fin origin *B. lancangjiangensis*

Balitora brucei Gray

Figs 1, 2a

Balitora brucei GRAY, 1830: pl. 88 (original description). — M'CLELLAND 1839: 299, 428, pl. 49 fig. 1 (diagnosis). — HORA 1920: 197, pl. 11 figs 2-4 (redescription; Darjeeling, Khasi Hills, Assam). — SILAS 1953: 206 (Darjeeling; Cherrapunji, Darbhanga). — RAHMAN 1975: 9 (Bangladesh). — MENON, GOVIND & RAJAGOPAL 1979 (discussion). — JAYARAM 1981: 144 (listed).

Balitora maculata GRAY, 1830: pl. 88 (original indication). — HORA 1920: 199, pl. 11 fig. 1 (redescription; Darjeeling). — SILAS 1953: 208 (compilation). — JAYARAM 1981: 144 (listed).

Platycara maculata: M'CLELLAND 1839: 299, 427, pl. 49 fig. 1 (diagnosis).

Platycara anisura McCLELLAND, 1842: 587, pl. 68 (original description; Kassyah Hills).

Homaloptera maculata: GÜNTHER, 1868: 340 (diagnosis; Kassyah Hills, Assam). — DAY 1869: 555 (Darjeeling).

Homaloptera brucei: VINCIGUERRA 1890: 323 (in part; discussion).

Material examined: RMNH 11924, neotype of *Balitora brucei* and *B. maculata*, 85.2 mm SL (figs 1, 2a); India: Assam: Priang R. near Cherrapunji; ex ZSI. — BMNH 1928.9.17: 1-3, 3 ex., 79.3-84.3 mm SL; India: Assam: Khasi Hill, Nangpiang; ex ZSI. — BMNH 1872.4.17: 41, 7 ex., 64.3-92.7 mm SL; India: Assam: Khasya; Jerdon. — BMNH 1872.4.17: 42, 2 ex., 86.1-96.1 mm SL; India: Assam; Jerdon. — BMNH 1860.3.19: 921, 1 ex., 97.9 mm SL; India: Assam: Khasya Hill; W. Griffith. — SMF 957, 5 ex., 64.8-105.6 mm SL; Nord-Indien; McClelland, 1847.

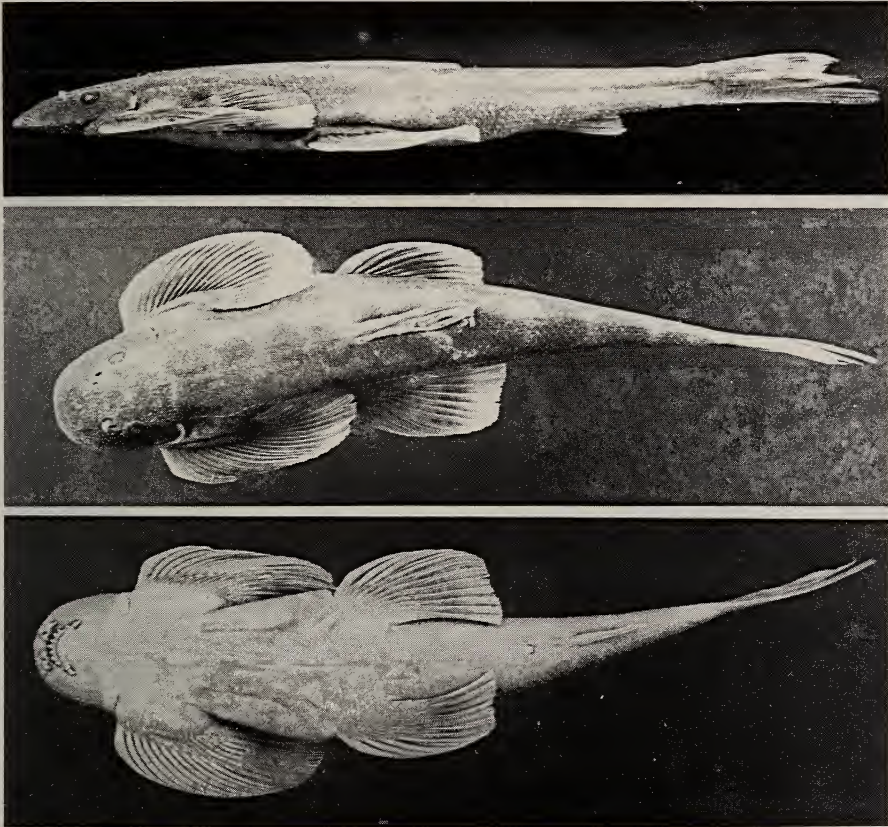


FIG. 1.

Balitora brucei, lectotype, RMNH 11924, 85.2 mm SL; India: Assam.

Diagnosis: *Balitora brucei* is distinguished from other species by the combination of the following characters: head length 19-22% SL (vs 23-25 in *B. mysorensis*), caudal peduncle 3.0-4.2 times longer than deep (vs 1.9-2.2 in *B. annamitica* and 1.9-2.8 in *B. meridionalis*), P 9-10/10-12 (vs 8/11-12 in *B. annamitica*), head width at nares 14.9-17.1% SL (12.8-13.8 in *B. burmanica* and 13.5-14.4 in *B. meridionalis*), 77-87% HL (60-70 in *B. burmanica* and 64-72 in *B. meridionalis*), maximum head width 86-105% HL (73-86 in *B. burmanica*), interorbital width 41-49% HL (37-42 in *B. burmanica*), length

of caudal peduncle 16.7-21.4% SL (14.4-16.3 in *B. meridionalis* and 13.0-15.2 in *B. annamitica*), preanal length 72.0-78.6% SL (78.3-80.2 in *B. meridionalis* and 78.5-80.4 in *B. annamitica*).

For general body shape see figure 1, for head shape see figure 2a, and for meristic and morphometric data see table 1. Belly naked in front of pelvic fin base. Scales with a very low and short keel and 5-7 small tubercles along posterior margin. Head with numerous uncini of various sizes and irregularly shaped, very few of them elongated and forming structures similar to scale keels.

Colour pattern: Among the examined specimens, the neotype only retains some colouration. The general colouration is dark brown. On the back there are 4 predorsal, 2 subdorsal and 5 postdorsal dark blotches surrounded by a lighter margin. Fins darker proximally, yellowish brown with darker markings on the rays at about 1/2-2/3 of their length.

Distribution: *Balitora brucei* is definitively known from Assam, Meghalaya, Darjeeling, Bhutan, and Bangladesh. Although recorded from Nepal by JAYARAM (1981) it is not mentioned by SHRESTHA (1981). Records from the Irrawaddy drainage in Burma should be checked as they probably refer to *B. burmanica*.

Discussion: *Balitora brucei* has first been used by GRAY (1830) in combination with a figure showing lateral and ventral view of an Indian fish. There is no type material and this fish cannot be identified with certainty with any of the known species of *Balitora*. In order to stabilize the nomenclature, it seems desirable to designate a neotype for the type species of the genus; this is even more needed now that the genus is type of the family. As it is the best preserved, the only one which still has some colouration and as it has reasonably detailed locality data, RMNH 11924 is here designated as neotype. The type locality is thus restricted as Priang River near Cherrapunji, in Assam, India. This way the name is strictly linked with the Indian species referred to as *B. brucei* by nearly all former authors.

The name *B. maculata* is available from the same plate by GRAY (1830) as *B. brucei*. No type specimen is known. DAY (1878, 1889) and JENKINS (1909) reported this species (as *Homaloptera maculata*) from South India. HORA (1920) reexamined DAY's specimens and concluded that they are not conspecific with GRAY's *Balitora maculata*. He described them as a new species: *Bhavana annandalei*.

HORA (1920: 196) described two specimens that he identified as *B. maculata*; he distinguished them from *B. brucei* by the pectoral fin reaching beyond pelvic origin (vs reaching pelvic fins). This is in complete disagreement with GRAY's illustration which shows pectoral fins not reaching pelvics. The only other diagnostic character mentioned by HORA is that caudal lobes are equal (vs lower lobe longer than upper one), a character evidently based on GRAY's figure as HORA's specimens had no caudal fins! HORA's key has been used uncritically by all subsequent authors (who had no additional specimens) (SILAS 1953; JAYARAM 1981).

Actually, I am unable to state whether or not HORA's (1920) *B. maculata* is the same as GRAY's (1830). I am also not sure that GRAY's illustration really shows a *Balitora*. It might eventually be a mixing of several species. In the dorsal view, the mouth seems nearly terminal, while in the ventral view it is obviously inferior. If the dorsal view is based on several specimens, one might be a nemacheiline with a wide head and body somewhat similar to the *Nemacheilus inglisi* Hora, 1935 of BANARESCU & NALBANT (1972: 238, fig. 2).

Considering the absence of the type(s) of Gray's *Balitora maculata*, the not very good quality of the original drawing and its possible composite nature, it does not seem desirable to retain this *nomen dubium*. In order to get rid of this poorly founded name, I designate RMNH 11924 as neotype of *Balitora maculata* Gray, 1830. As this specimen is designated here also as neotype of *B. brucei*, both are simultaneous objective synonyms. As first reviser, I designate *B. brucei* as the valid name for the species and *B. maculata* as its objective junior synonym.

As it has not been possible to get access to HORA's (1920) specimens in order to check his diagnosis, I cannot get a definite opinion about the specific distinctness of the material he identified as *B. maculata*. According to HORA's figure they seem to differ from *B. brucei* by head shape (more rounded in *B. "maculata"*), eye position, longer snout and possibly shorter head. HORA also described differences in scales but it seems from his text that this was based on a single scale of each species. The difference in extent

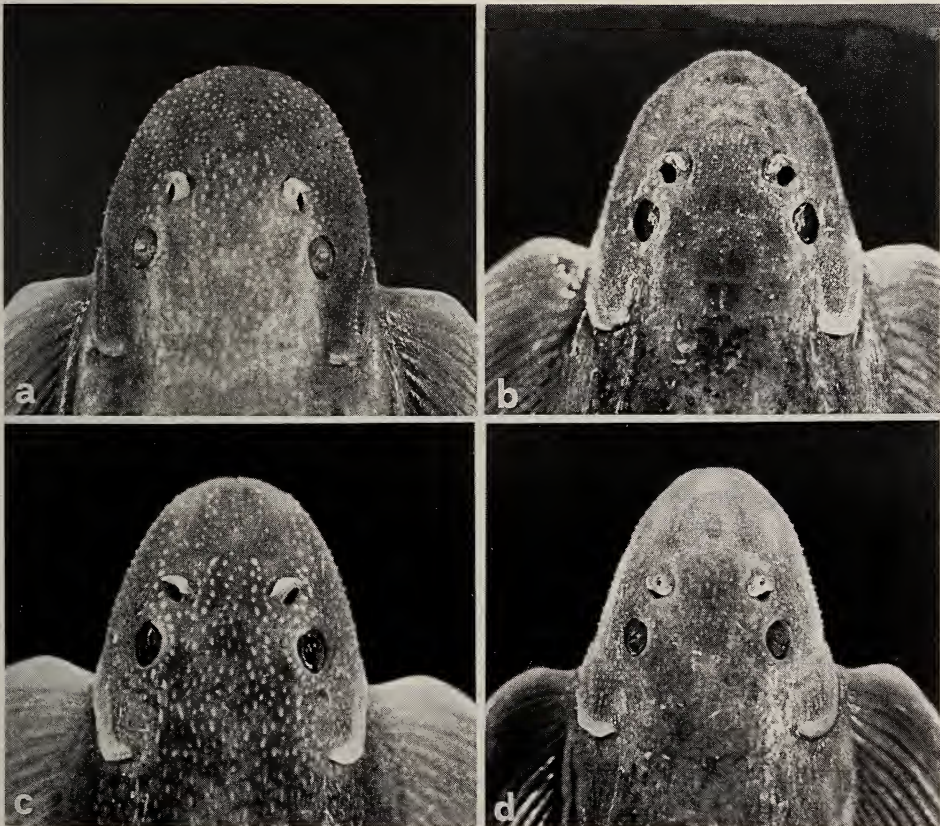


FIG. 2.

Head of a. *Balitora brucei*, lectotype, RMNH 11924, 85.2 mm SL; b. *B. meridionalis*, paratype, CMK 4374, 78.0 mm SL; c. *B. burmanica*, CMK 4373, 60.3 mm SL; d. *B. annamitica*, holotype, MNHN uncat., 79.7 mm SL.

of pectoral fins might show some variation depending of the age of the specimens. If really HORA's *B. maculata* is different of *B. brucei* it would better deserve a new name than the old problematic *B. maculata* (and this must be based on new collection of numerous fresh and well preserved specimens and not on the old specimens, in bad state, already described by HORA!).

DAY (1867, 1872, 1878, 1889) and GÜNTHER (1868) reported this fish (as *Homaloptera brucei*) from southern India. HORA (1920) reexamined DAY's specimens and concluded that they represented *Bhavana australia* Jerdon, 1849. *Balitora brucei* of VINCIGUERRA (1890) is discussed below as *B. burmanica*. *Balitora brucei* of LI (1976) and CHEN (1978) is *B. lancangjiangensis* and the *Homaloptera brucei* of YEN (1978) is either *B. lancangjiangensis* too or *B. kwangsiensis* (KOTTELAT & CHU 1988). The material mentioned as *Pseudogastromyzon sinensis* (Sauvage & Dabry, 1874) by ZHANG (1959) and tentatively referred to *B. brucei* by CHEN (1978) has been described as *B. tchangi* by Zheng, in ZHENG, CHEN & HUANG (1982); in the generic introduction, I explicitly excluded it from *Balitora*.

***Balitora mysorensis* Hora**

Balitora brucei var. *mysorensis* HORA, 1941: 232, pl. 8 fig. 4 (type locality: Sivasamudram, Mysore State, India; holotype: ZSI F 13512/1). — SILAS 1953: 206.

? *Balitora shimogensis* SILAS & KALAWAR, in KALAWAR & KELKAR 1956: 675 (nomen nudum).

Balitora mysorensis: MENON, GOVIND & RAJAGOPAL 1979 (new combination). — JAYARAM 1981: 149 (listed).

No material seen.

Diagnosis: *Balitora mysorensis* is distinguished from any other species of the genus by its longer head (23-25% SL, vs 19-23 in the other species). From *B. annamitica*, *B. burmanica* and *B. meridionalis* it is easily distinguished by its greater number of scales along lateral line (64-65, vs 61-64), from *B. burmanica* and *B. brucei* by its stouter caudal peduncle (1.9 times longer than deep, vs 3-4). See HORA (1941) and MENON *et al.* (1979) for description.

Distribution: Known from very few specimens from Cauvery and Thungabhadra river systems in Karnataka State, India.

Discussion: KALAWAR & KELKAR (1956: 675) refer to a *Balitora* species as "*B. shimogensis* Silas & Kalawar", stating that it is a new species from Shimoga, Mysore State and Kolhapur, Bombay State and that the new species will be described elsewhere. As far as I am aware, this "species" has not been described. MENON *et al.* (1979) report a single specimen from Shimoga (ZSI F 686/2); the same specimen is mentioned by SILAS (1953) as *B. brucei* var. *mysorensis*. This is a nomen nudum that I tentatively refer to the synonymy of the present species.

***Balitora burmanica* Hora**

Figs 2c, 3

Homaloptera brucei (nec GRAY, 1830): VINCIGUERRA, 1890: 324 (Meekalan, Mekan). — PRASHAD & MUKERJI 1929: 190 (Myitkyina).

Balitora brucei var. *burmanicus* HORA, 1932: 291, pl. 11, fig. 6 (original description; Myitkyina, Chittagong Hills; no holotype designated). — SILAS 1953: 207 (Mooleyit, Pegu). — MENON,

GOVIND & RAJAGOPAL 1979 (synonym of *B. brucei*).

Balitora brucei var. *melanosoma* HORA, 1932: 291, pl. 10, fig. 6 (original description; type locality: Thaugyin River, Thai-Burmese border; holotype: BMNH 1920.9.8: 11).

Hemimyzon formosanum (nec BOULENGER, 1894): SMITH, 1945: 281 (Thaugyin River).

Balitora brucei brucei: JAYARAM 1981: 144 (listed; in part).

Material examined: BURMA: MCSNG 15171, lectotype (present designation), 54.2 mm SL; Meekalan; Fea, 1887. — MCSNG (ex 15171) 7 ex., paralectotypes, 49.1-74.9 mm SL; same data. — MCSNG uncat., 1 ex., paralectotype, 49.7 mm SL; same data. — BMNH 1920.9.8: 1, holotype of *Balitora brucei melanosoma*, 81.9 mm SL; Megla stream, Thaugyin River, Thai-Burmese border; Stockley. — NMB 774-778, 5 ex., 49.0-53.5 mm SL; Mt. Muleyit; Fea.

THAILAND: MAE HONG SON PROV.: NIFI uncat., 1 ex., 78.3 mm SL; Nam Tok Pasna, Ban Mok Djam Pae, Amphoe Muang; 27.III.1982. — NIFI uncat., 2 ex., 58.5-59.8 mm SL; Nam Lan, Tambon Ban Ma Pa, Amphoe Muang; Ukkatawewat, 25.III.1981. — NIFI uncat., 4 ex., 35.1-57.8 mm SL; Ban Mae Sangii, Tambon Huai Pa, Amphoe Muang; Ukkatawewat, 26.III.1978. — NIFI uncat., CMK 7373, 56 ex., 32.1-63.6 mm SL; Nam Mae Sarieng, Amphoe Mae Sarieng; Ukkatawewat, 20.III.1981. — CMK 4367, 1 ex.; same data; cleared and stained. — CMK 4051, 2 ex., 48.6-50.5 mm SL; Nam Mae Pai at Pai; P. Hobelman, 21.IV.1983. TAK PROV.: NIFI uncat., 1 ex., 32.0 mm SL; Huai Mae Son, Amphoe Tha Song Yang; 20.I.1982.

Diagnosis: *Balitora burmanica* is distinguished from all other species of *Balitora* except *B. brucei* by its thin caudal peduncle (3-4 times longer than deep, vs 1.9-2.8; length 16-21% SL, vs 13-16 and 72-106% lateral HL, vs 65-82); it differs from *B. brucei* by a larger eye (3.0-4.0% SL; vs 2.3-3.3), thinner head (73-85% HL, vs 86-105) and shorter interorbital width (37-42% HL, vs 40-44).

For general body shape see figure 3, for head shape see figure 2c, for morphometric and meristic data see table 1. Body entirely covered by scales, except on belly in front of pelvic fin origin. A principal longitudinal keel on each scale and above and below 1-2 small additional keels. Top of head covered by slightly longitudinally elongated unculi.

Colouration: Ground colour dark brown, belly yellowish, usually 6 contiguous regularly shaped large blotches along the back, bordered by a light brown area. Pectoral and pelvic fins proximally dark brown, then an orange area and a brown band; the distal area is hyalin. A dark mark at mid-height of anal and dorsal fins. Lower caudal lobe dark brown. A vertical bar on caudal fin.

Discussion: HORA (1932) did not designate any type specimen. He indicated that he had seen material collected by FEA in Meekalan and Meetan (listed by VINCIGUERRA, 1890), by CHOPRA in Myitkyina District (PRASHAD & MUKERJI 1929: 190) and by MULLINS on Chittagong Hills. HORA examined the whole FEA collection while he visited MCSNG in 1928-29 (HORA 1932: 264). SILAS (1953: 207) listed 3 specimens (ZSI F 11034/1) as [holo]type; this is obviously not correct. As it was impossible to get access to ZSI material, I designate MCSNG 15171 as lectotype. The type locality is thus Meekalan. Specimens NMB 774 collected at Mt. Muleyit by FEA apparently have been collected together with some of the syntypes. However, they are not paralectotypes as they were no longer in Genova when HORA was there and examined the type series. It appears that other specimens collected by FEA have been used for exchange and are now present in several museum (e.g. USNM, RMNH, etc.); their status as types depends of the date of the exchange.

I have examined the lectotype and 8 paralectotypes from Meekalan (= Mikalaung Chaung, a stream approximately 16°07'N 98°25'E) and 6 specimens collected by FEA at Mt. Mooleyit (= Mulayet Taung, 16°16'N 98°32'E). The Meetan (= Mitan Chaung) is a small rivulet flowing south from the summit of Mulayet Taung. Specimen NIFI uncat.

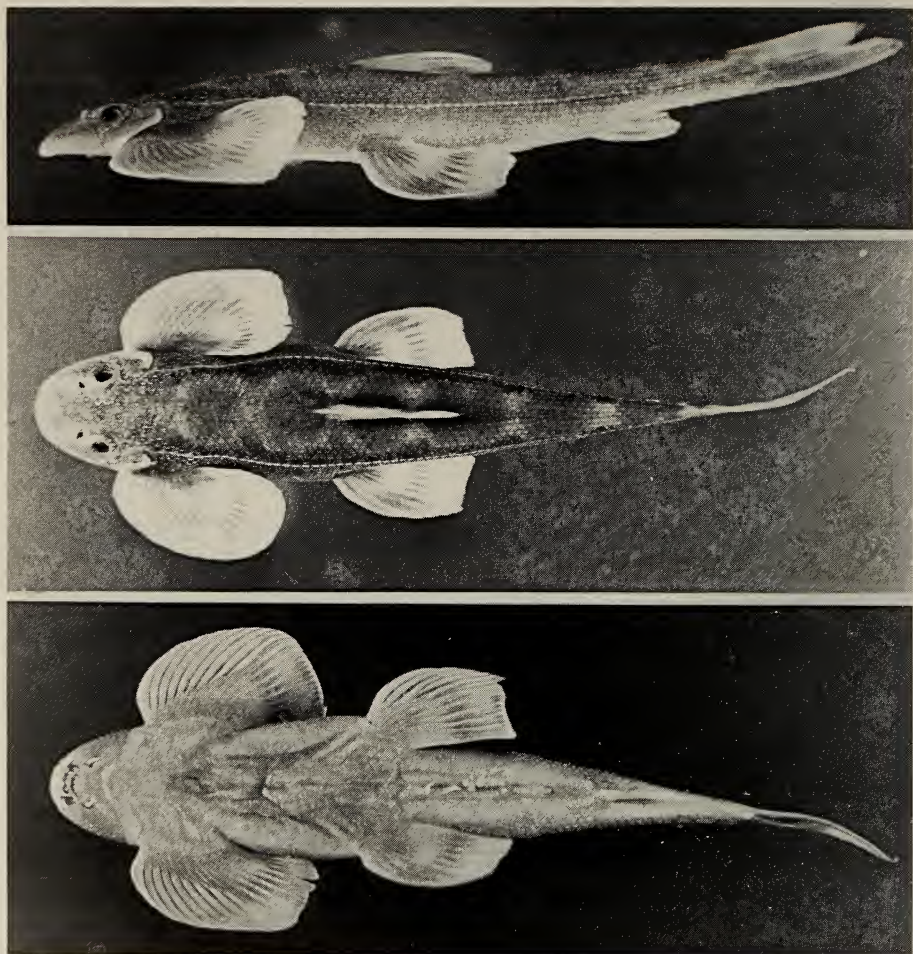


FIG. 3.

Balitora burmanica, CMK 4373, 60.3 mm SL; Thailand: Salween basin.

from Tak Province has been collected in Huai Mae Son (Nam Mae Song) a tributary of the Mae Nam Moei (Thaugyin in Burmese) entering it at $17^{\circ}18'N$ $98^{\circ}08'E$. The type locality of *B. b. melanosoma* is Megla stream (HORA 1932), a tributary of the Mae Nam Moei too. Megla is most probably the Megala, which enters Mae Nam Moei on the Burmese side at $16^{\circ}20'N$ $98^{\circ}40'E$; it has its headwaters on the Mulayet Taung, on the opposite slope to Miton Chaung and Mikalaung Chaung. I have examined the holotype of *B. b. melanosoma* and could not find any difference between it and other specimens referred to *B. burmanica*; I also examined material of *B. brucei* which is nearly topotypical for *B. b. melanosoma* (NIFI uncat., Huai Mae Son). I do not hesitate in considering it as conspecific with *B. burmanica*. This also applies for other Salween basin material in NIFI and CMK. It seems that HORA's only reason in distinguishing and

	<i>B. brucei</i>		<i>B. burmanica</i>		<i>B. meridionalis</i>		<i>B. annamitica</i>	
	Range	Mean	Range	Mean	Range	Mean	Range	Mean
Standard length [mm]	64.3-105.6	118.3	50.0- 81.9	121.6	56.4- 81.5	127.9	57.0-79.7	
Total length	108.1-124.2		114.2-129.2		125.7-131.2		123.5	
Head length	18.5- 22.0	20.0	19.2- 22.7	21.3	19.6- 21.4	20.3	19.5-21.5	20.5
Dorsal head length	17.9- 21.9	20.3	19.7- 23.7	22.1	20.8- 23.4	21.7	21.1-22.9	21.8
Predorsal length	43.2- 46.3	44.7	42.9- 47.6	45.2	45.3- 47.1	45.9	46.0-48.2	47.0
Prepelvic length	42.2- 46.6	44.6	43.3- 47.8	45.2	44.7- 46.8	45.5	48.1-48.9	48.5
Pre-anus length	65.3- 77.8	70.1	67.7- 72.6	69.4	73.2- 75.2	74.5	72.6-74.9	74.0
Preanal length	72.0- 82.4	76.3	73.5- 79.2	76.2	78.3- 80.2	79.4	78.5-80.4	79.3
Head depth (at eye)	5.5- 7.0	6.4	6.5- 8.0	7.1	6.9- 7.9	7.4	7.5- 7.8	7.7
Head depth (at nape)	6.6- 8.0	7.6	7.6- 9.8	8.8	8.3- 9.7	8.8	8.4- 9.4	8.9
Body depth	9.6- 12.5	10.8	10.0- 12.7	11.6	11.2- 12.1	11.8	13.0-13.6	13.2
Depth of caudal peduncle	5.1- 5.8	5.4	5.1- 6.3	5.7	5.6- 6.5	6.1	6.2- 6.8	6.6
Length of caudal peduncle	16.7- 21.4	18.9	15.9- 20.5	18.4	14.4- 16.3	15.6	13.0-15.2	13.8
Snout length	11.5- 12.2	11.8	11.4- 17.6	13.0	11.5- 12.2	11.7	11.2-12.4	12.0
Head width (at nares)	14.9- 17.1	16.1	12.8- 13.8	13.5	13.5- 14.4	13.9	13.1-14.6	13.7
Maximum head width	17.2- 20.5	18.7	15.3- 18.2	17.0	17.4- 18.2	17.7	17.1-18.5	17.6
Body width (D)	17.7- 21.0	19.4	15.8- 18.5	16.7	17.9- 21.4	19.7	17.0-19.2	18.2
Body width (A)	5.4- 8.1	7.0	6.4- 7.4	6.9	7.0- 7.8	7.5	8.1- 8.5	8.4
Eye diameter	2.3- 3.3	2.9	3.0- 4.0	3.5	2.6- 4.0	3.2	2.7- 3.1	2.9
Interorbital width	8.4- 9.6	9.0	7.6- 9.0	8.5	7.5- 9.0	8.4	7.9- 8.4	8.1
Height of dorsal fin	17.0- 21.4		17.1- 20.6		18.3- 20.9		17.0-20.7	
Length of upper caudal lobe	16.1- 19.3		17.7- 20.2		17.8- 25.0		20.0-23.5	
Length of lower caudal lobe	17.5- 25.0		22.7- 26.6		25.7- 31.5		26.0-26.3	
Length of median caudal rays	15.6- 21.1		12.6- 15.6		15.5- 16.4		14.8-19.2	
Height of anal fin	9.7- 12.7		12.2- 13.9		12.8- 13.8		11.9-13.6	
Length of pelvic fin	21.5- 24.4		19.7- 22.2		23.4- 24.4		22.3-22.4	
Length of pectoral fin	26.8- 30.6		22.3- 27.7		25.3- 28.9		24.2-27.2	
Caudal peduncle: length/depth	3.2- 4.0	3.5	3.0- 4.0	3.4	1.9- 2.8	2.5	1.9- 2.2	2.1
D	3/8½		3/8½		3/8½		3/8½	
A	3/5½		3/5½		3/5½		3/5½	
P	9-10/10-12		8-10/10-12		9-10/11		8/11-12	
V	2/9-10		2/9		2/9		2/9-11	
L.L.	61-66	63.4	62-65	62.8	62-64	63.0	61-62	61.6

naming *B. b. melanosoma* was the dark colour of the only known specimen. The holotype is actually very dark, but this colour is certainly an artefact: the fish appears to have been preserved in brandy (or any other brown and sweet alcohol), the colour in the jar actually has a brandy colour and a very strong brandy smell.

Balitora burmanica and *B. b. melanosoma* are simultaneous synonyms. As first reviser, I retain *B. burmanica* and consider *B. melanosoma* as a junior subjective synonym.

Distribution: *Balitora burmanica* has only been collected in the Irrawaddy and Salween basins of Burma and Thailand. It might be looked for in these basins in Yunnan and the Chindwin basin in Manipur, Assam.

***Balitora meridionalis* new species**

Figs 2b, 4

Holotype: NIFI uncat., 81.5 mm SL; Thailand: Chantaburi prov.: Kao Soi Dao, Chan River headwaters; Somphongs Aquarium, XII.1978.

Paratypes: NIFI uncat., 5 ex., CMK 4374, 3 ex., 29.0-78.0 mm SL; same data.

Diagnosis: The new species is distinguished from other species of the genus by the combination of the following characters: lateral length of head 19-22% SL (23-25% in *B. mysorensis*), lateral line scales 62-64 (64-65 in *B. mysorensis*), caudal peduncle 1.9-2.8 times longer than deep (3.0-4.2 times in *B. burmanica* and *B. brucei*). From the quite similar *B. annamitica* it is distinguished by the characters given in the above key and a colour pattern consisting of somewhat irregular blotches on the back (vs circular in *B. annamitica*).

For general body shape see figure 4; for head shape see figure 2b; for meristic and morphometric data see table 1. Body completely covered by scales, except belly in front of anus. Scales slightly keeled and with 3-5 small tubercles along their posterior margin; the keels are very feeble in front of dorsal fin. Unculi in interorbital area, on cheeks and on nape minute and circular; a few larger ones at tip of snout, between nares and between nares and eyes.

Anterior lip with nine major papillae only in the inner 2/3 of its width, and small papillae alternating with major ones. Several small papillae at the corner of the mouth. Lower lip with three blunt large papillae on each side and two median ones.

Colouration: Brownish with 3-4 predorsal + 5-6 sub- and postdorsal dark circular blotches on the back, edged with a lighter margin. Sides mottled. Belly yellowish brown. One row of spots on dorsal fin rays. A longitudinal stripe on lower caudal lobe.

Etymology: *meridionalis*: meaning southern, as it is the southernmost species of the genus in the Indochinese peninsula.

***Balitora annamitica* new species**

Figs 2d, 5

Balitora sp. nov. KOTTELAT, 1985: 266 (Boun Long).

Holotype: MNHN, 79.7 mm SL; Kampuchea: Boun Long (13°42'N 107°00'E), Grande Cascade; d'Aubenton, 25.II.1964.

Paratypes: MNHN, 1 ex., 57.0 mm SL; same data. — MHNG 2154.05, 1 ex., 70.0 mm SL; same data.

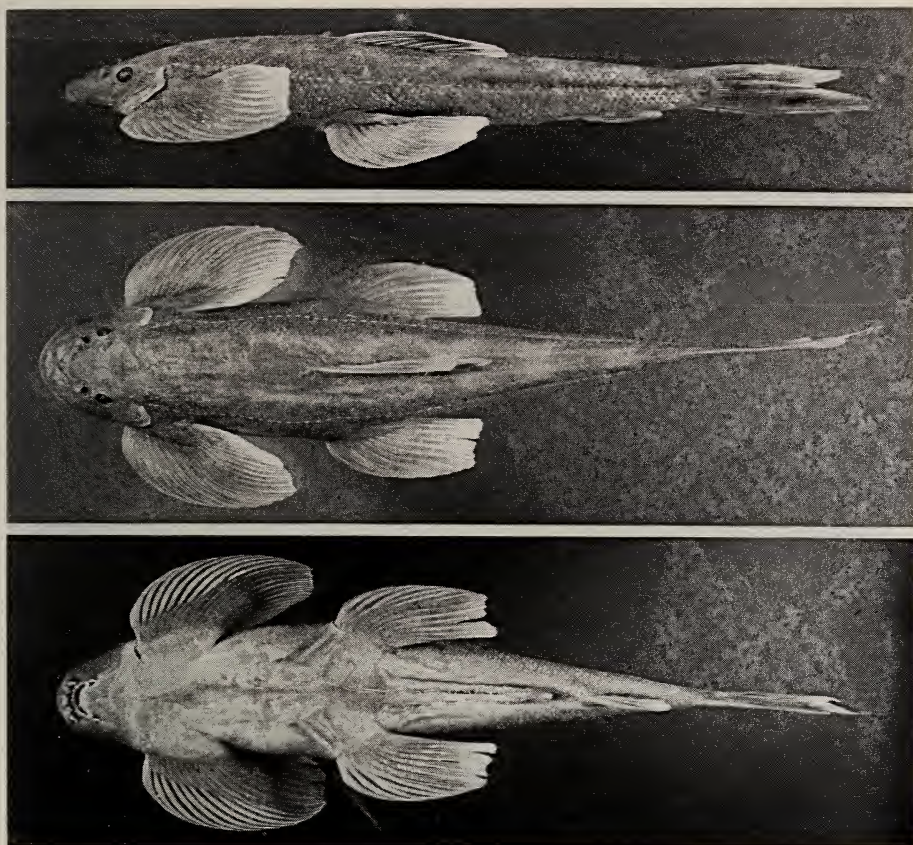


FIG. 4.

Balitora meridionalis, paratype, CMK 4374, 78.0 mm SL; south-east Thailand, coastal basin.

Diagnosis: A new *Balitora* easily distinguished by the combination of the following characters: lateral line scales 61-62 (vs 64-65 in *B. mysorensis*); eye diameter 14-15% HL (vs 14-19 in *B. burmanica*) and 2.7-3.0 times in interorbital width (vs 2.2-2.5 in *B. burmanica*); caudal peduncle 1.9-2.2 times longer than deep (3.0-4.2 times in *B. burmanica* and *B. brucei*), lateral head length 19-22% SL (vs 23-25 in *B. mysorensis*), characters differentiating it from the closely related *B. meridionalis* are given in the above key.

For general body shape see figure 5; for head shape see figure 2d; for morphometric and meristic data see table 1. Body entirely covered by scales except in front of pelvic fin origin. Each scale with a prominent longitudinal keel. Tubercles on nape, in interorbital area and on cheeks elongated, similar in size to the keels on scales; no larger ones at tip of snout or between nares.

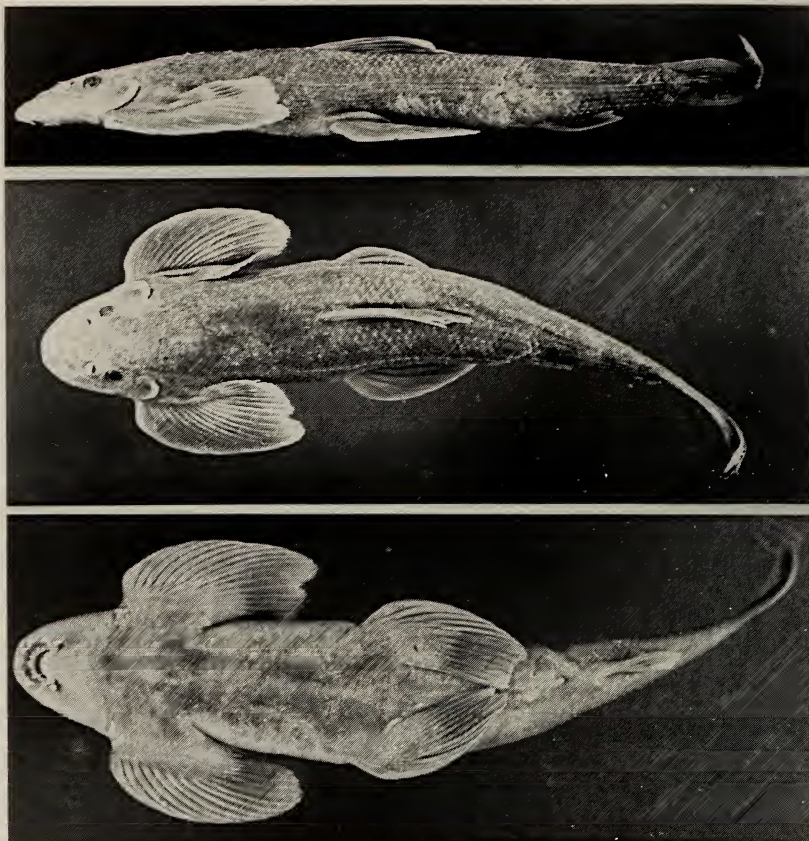


FIG. 5.

Balitora annamitica, holotype, MNHN uncat., 79.7 mm SL. North-east Kampuchea, Mekong basin.

Colouration: Ground colour olivaceous brown. Seven to eight large dark brown blotches on the back and several small, vertically elongated ones along lateral line. Belly lighter brown. Head lighter brown with irregular darker markings on nape. Caudal fin dark brown with a median diffuse darker area and a distal yellowish area.

Type locality, habitat: The three type specimens have been collected at the Grande Cascade near Boun Long (Fig. 6) in the north-eastern corner of Kampuchea, in the drainage of the Srépok, in the Mekong basin. This waterfall is approximately 5 m high (D'AUBENTON, pers. comm.) and the fishes have been collected upstream and downstream of the waterfall during the dry season. During high-water season, the water level rises drastically and the falls are no longer an obstacle for fishes who can move either in the mainstream or through side rivulets resulting from the floods.



FIG. 6.

Grande Cascade at Boun Long, Ratanakiri Province, Kampuchea; type locality of *Balitora annamitica*. Photo: F. d'Aubenton, February 1964.

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